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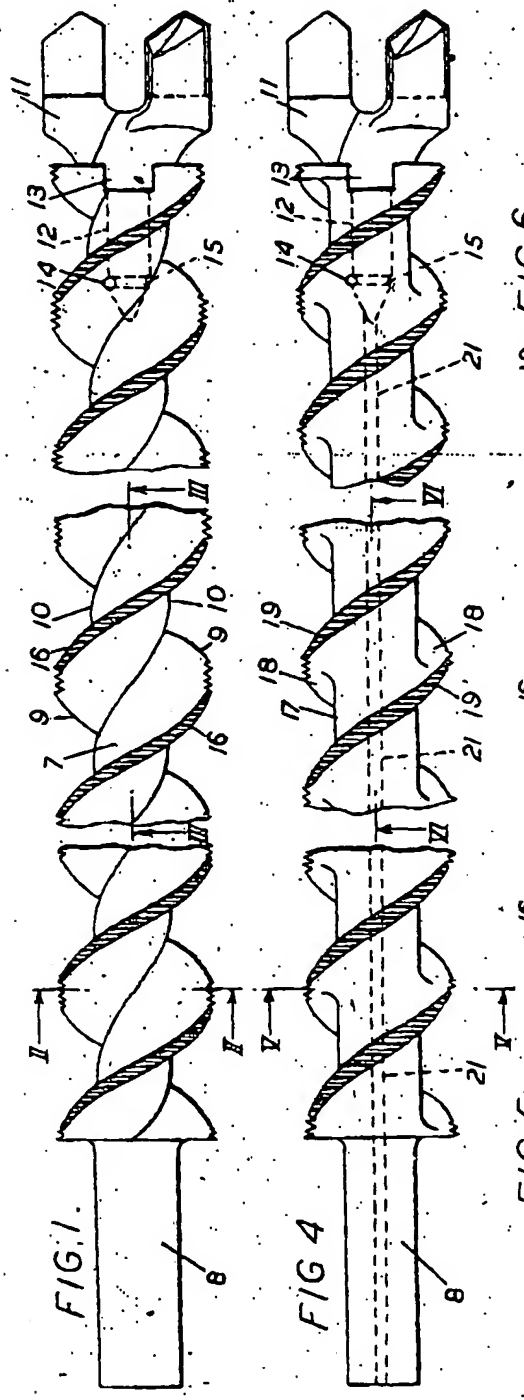
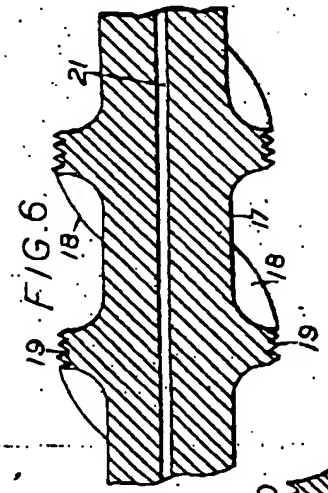
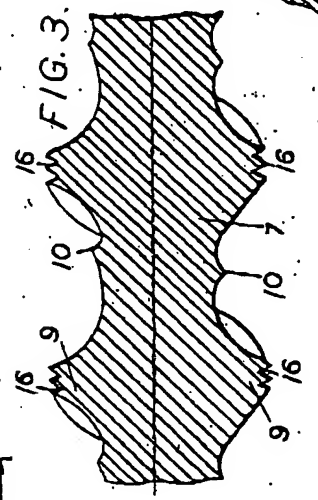
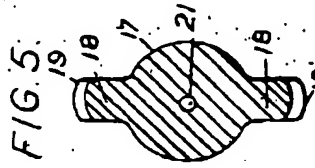
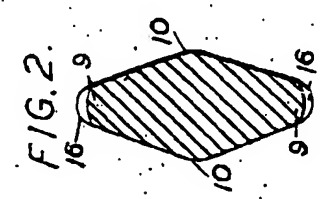
Zu der Patentschrift 803 291
Kl. 5b Gr. 18











TRANSLATION of German Patent No. 803291

Issued on 2nd April 1951

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Reginald William Mann, Wallsend-on-Tyne, Northumberland (England) was named as inventor

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Rotary coal and rock drill with web

Patented in the territory of the Federal Republic of Germany from the 27th January 1950
Grant of patent published on 25th January 1951
The priority of the application in Great Britain dated 26th January 1949 is claimed.

The subject of the invention is rotary drills for coal and rock. The aim of the invention is so to construct the drill rod that the forward feed pressure required for hand-held drilling apparatuses is reduced or the forward feed rate at a given forward feed pressure is increased by comparison with drill rods of known type.

According to the invention, in a drill rod with web and with a drilling tip at the forward end, the surface of the web is provided with a cut screw thread of small pitch which grips the cuttings, conveyed back by the web, between itself and the wall of the hole being drilled, or directly on a part of the wall of the hole being drilled, and imparts a forward feed to the drill rod during its rotation.

The invention is illustrated in the drawings, in

which:

Figure shows a side view of an embodiment of the drill rod with drill tip, with a shortened drill rod,

Figure 2 shows an enlarged section along the line II-II of Figure 1,

Figure 3 shows an enlarged longitudinal/centre section of a part of the drill rod on the line III-III of Figure 1,

Figure 4 shows a side view of another embodiment of the drill rod of shortened length with drill tip,

Figure 5 shows an enlarged cross-section on the line V-V of Figure 4,

Figure 6 shows an enlarged longitudinal/centre section of part of the drill rod on the line VI-VI of Figure 4 and

Figure 7 shows a part of a spiral rib in section with a modified thread shape on its outer surface.

The drill rod shown in Figures 1, 2 and 3, for the purposes of the invention, is modified from a design which is known per se, in which the drill rod 7 has a shank 8 for insertion, known per se, in a rotary drill.

With the exception of the shank 8, the cross-section of the drill rod 7 is rhomboidal over its entire length, the opposed corners furthest from each other forming ribs 9 which wind in a spiral round the rod 7, while the opposed corners closest to each other form secondary spiral ribs 10 which lie between the main ribs 9.

The drill rod 7 carries at its forward end a drill tip 11 of known type having an insert piece 12 for centring in the rod 7 and having a tongue 13 at its base surface, which engages in a corresponding slot at the end of the rod 7 and transmits the rotary movement. A pin 14 fastened transversely in the drill rod 7 engages in a groove 15 in the insert piece 12 in order to hold the drill tip 11 on the drill rod 7.

In a normal drill rod the outer surfaces of the spiral ribs are smooth. According to the invention, threads 16 are formed on the outer surface of the web 9 in order

either to grip the cuttings, which are conveyed back by the web 9 and jam between the thread and the wall of the hole being drilled, or to grip directly a part of the wall of the drilled hole itself, and impart a forward feed to the drill rod 7 on its rotation. The outside diameter of the drill rod 7 is smaller than the cutting diameter of the drill tip; the thread 16 accordingly does not touch the wall of the hole being drilled when the drill rod 7 is held concentrically therein.

The thread 16 has a relatively small positive pitch compared to the coarse positive pitch of the web 9. Consequently the threads 16 are interrupted. The width of the outer surfaces of the spiral ribs 9 is therefore selected such that the cut threads 16 are long enough to impart an effective forward feed to the drill.

The cuttings are conveyed along the hole being drilled by means of the pressure of the rear flanks of the drill rod web 7 in conjunction with the friction on the wall of the hole being drilled, backwards to the outlet of the drilled hole. Consequently, some cuttings penetrate from time to time into the gap between the cut threads 16 on the outer surface of the web 9 and the wall of the hole being drilled. The particles of the cuttings wedge into the interstice and are squashed to a certain extent by the rotation of the drill rod 7 in the hole being drilled, before they are conveyed further by way of the forward flank of the next turn of the web 9. The friction of these particles on the wall of the hole being drilled produces a forward feed on the web 9. As a result of a certain sliding and squashing of these particles, the forward feed produced does not correspond exactly to that determined by the pitch of the cut threads.

At the start of drilling work, no such forward feed is observable on the drill rod 7, of course, until it enters the hole being drilled. As the drilling work progresses deeper into the hole, the forward feed increases

progressively. Experiments have shown that the forward feed can be altered by lateral pressure of the drill rod 7 in the hole. The drill operator can incline the drill downwards or towards one side in the hole, so that the cut threads 16 on the web 9 bite directly into the wall of the drilled hole itself. This is to be recommended generally where the drill tip 11 meets a hard spot in the coal or rock wall to be drilled. A rapid sideways movement of the drill thereby produces sufficient forward feed pressure to break through the hard spot.

As long as a considerable forward feed rate is maintained, a fairly large quantity of cuttings moves backwards through the grooves of the web 9 and by way of the cut threads 16. The frictional resistance thereby produced is not too great to make the deliberate withdrawal of the drill for cleaning or after completion of the drilled hole impossible. It may however be necessary for this purpose to move the drill rod forwards and backwards axially several times in order to free it.

The drill rod 7 of Figures 1 to 3 with rhomboidal cross-section is suitable for drilling relatively soft rock or coal, since it can clear away a large quantity of cuttings.

The drill rod 17 of Figures 4 to 6 is suitable for harder, abrasive rock. The body of the rod 17, issuing from the shank 8, is cylindrical, and on opposite sides of the cross-section of the rod 17 there are two spiral ribs 18. The outer surface of the spiral 18 is provided with cut threads 19 which act similarly to the threads 17 on the drill rod 7 in the exemplary embodiment described previously.

The drill rod 17 can be designed in a manner known per se for wet drilling, by providing a central hole 21 through which water flows along the drill rod 17 and through an opening round the insert piece 12 of the drill tip 11 to the working surface. During wet drilling, part of the

cuttings adheres to the entire circumference of the wall of the hole being drilled and assists the forward feed effect.

Figure 7 shows a part of a drill rod web in section, on which an oblique thread 20 is provided. A thread of this type can be used both in the drill rod 7 and in the drill rod 17, and for certain types of rock results in a better forward feed. The oblique surfaces of the thread 20 must of course lie on the rearward flanks.

The invention is not restricted to drill rods having the cross-sectional shapes illustrated in the drawings, but can be used with any coal or rock drill rod with web if the outer surface of the web is wide enough to receive effective threads.

PATENT CLAIMS

1. Drill rod with web for use in rotary drills for coal and rock and with provision for securing a drill tip at its forward end, characterised in that the outer surface of the drill rod web carries a cut thread of small pitch, which either grips the cuttings conveyed back by the web between the cut thread and the wall of the hole being drilled, or grips directly a part of the wall of the drilled hole itself and imparts a forward feed to the drill rod on its rotation.

2. Drill rod according to claim 1, characterised in that the cut thread of small pitch is in the shape of an oblique thread with oblique rear flanks.

Hereto 1 page of drawings
